

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No. MO-0111287

Owner: City of Cleveland
Address: 209 West Main, Cleveland, MO 64734

Continuing Authority: Same as above
Address: Same as above

Facility Name: Cleveland Wastewater Treatment Plant
Facility Address: State Route Y, Cleveland, MO 64734

Legal Description: SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 33, T45N, R33W, Cass County

Receiving Stream: Tributary to Massey Creek (C)
First Classified Stream and ID: Tributary to Massey Creek (C)(01268)
USGS Basin & Sub-watershed No.: (10290108-020001)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 - POTW - SIC #4952

Discharging system and Partial Irrigation

Aerated Lagoon two-cell lagoon/center pivot irrigation/sludge is retained in lagoon.

Design population equivalent is 1,000.

Actual population 400.

Design flow is 100,000 gallons per day.

Actual flow is 40,000 gallons per day.


Design sludge production is 18 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 644.051.6 of the Law.


April 5, 2002
Effective Date

March 10, 2006
Modification Date

April 4, 2007
Expiration Date
MO 780-0041 (10-93)



Doyle Childers, Director, Department of Natural Resources
Executive Secretary, Clean Water Commission



Karl Fett, Director, Kansas City Regional Office

FACILITY DESCRIPTION (continued)

Receiving Stream Watershed: Massey Creek a gaining stream setting.

Facility Type:

Partial Irrigation System during growing season as needed for consumptive irrigation and treated effluent discharge during remainder of the time.

<u>Design Basis:</u>	<u>Avg Annual</u>	<u>Recreational Season (Mar –Oct)</u>	<u>Winter: (Nov –Feb)</u>
Design dry weather flows	<u>24,000</u> gpd	<u>N/A</u> gpd	<u>N/A</u> gpd
Design with 1-in-10 year flows	<u>40,000</u> gpd	<u>N/A</u> gpd	<u>N/A</u> gpd
Design PE <u>1,000</u>			

Storm Water Flows: (Cass County)

Average Annual Rainfall.	<u>42</u> inches	
1-in-10 Year Annual Rainfall.	<u>49.4</u> inches	25-year-24-hour storm: <u>7</u> inches

1-in-10 year Flows:	<u>Annual</u>
Runoff concrete and roof areas	<u>3.3</u> ft.
Runoff earth areas (lagoon berm, lots, etc)	<u>2.0</u> ft.
Rainfall minus Evaporation (R-E) on lagoon water surface	<u>12</u> ft.

<u>Lagoon Dimensions:</u>	<u>(Length x Width)</u>	<u>Surface Area</u>	<u>Depth from Bottom</u>	<u>Pump down depth</u> (from spillway)
Inside Top Berm Basin 1:	<u>440' X 340'</u>	<u>3.43</u> sq.ft.	<u>6.0</u> feet depth	
Inside Top Berm Basin 2:	<u>230' X 230'</u>	<u>1.21</u> sq.ft.	<u>6.0</u> feet depth	
Emergency Spillway:	<u>N/A</u>	<u>N/A</u> sq.ft.	<u>7.0</u> feet depth	<u>0.0</u>
Freeboard: (top berm to spillway	<u>1</u> feet depth)			
Maximum operating level			<u>7.0</u> feet depth	<u>1.0</u> feet
Minimum operating level			<u>2.0</u> feet depth	<u>5.0</u> feet
Aerobic BOD design basis			<u>3.0</u> feet depth	
Storage volume (minimum to maximum water levels)	<u>6.84</u>	MG		
Berm top width: <u>10</u> feet	Berm runoff area (Centerline to emergency spillway)	<u>N/A</u> sq.ft.		
1-in-10 year Annual Storm water flows into lagoon (R-E):	<u>12.0</u> cu.ft.	(<u>89.76</u> gallons)		

<u>Storage Capacity:</u>	<u>Avg Annual</u>	<u>Days of Storage</u> <u>Mar-Oct.</u>	<u>Winter</u>
Design for Dry weather Flows:	<u>285</u> days	<u>N/A</u> days	<u>N/A</u> days
Design with 1-in 10 year flows:	<u>171</u> days	<u>N/A</u> days	<u>N/A</u> days

Land Application:

Irrigation Volume/year: 11,972,000 gallons (including 1-in-10 year flows)

Irrigation areas: 24 acres at design loading (80 acres total available)

Application rates/acre: 0.15 inch/hour; 0.75 inch/day; 3.0 inches/week; 24 inches/year

Field slopes: less than 1 percent

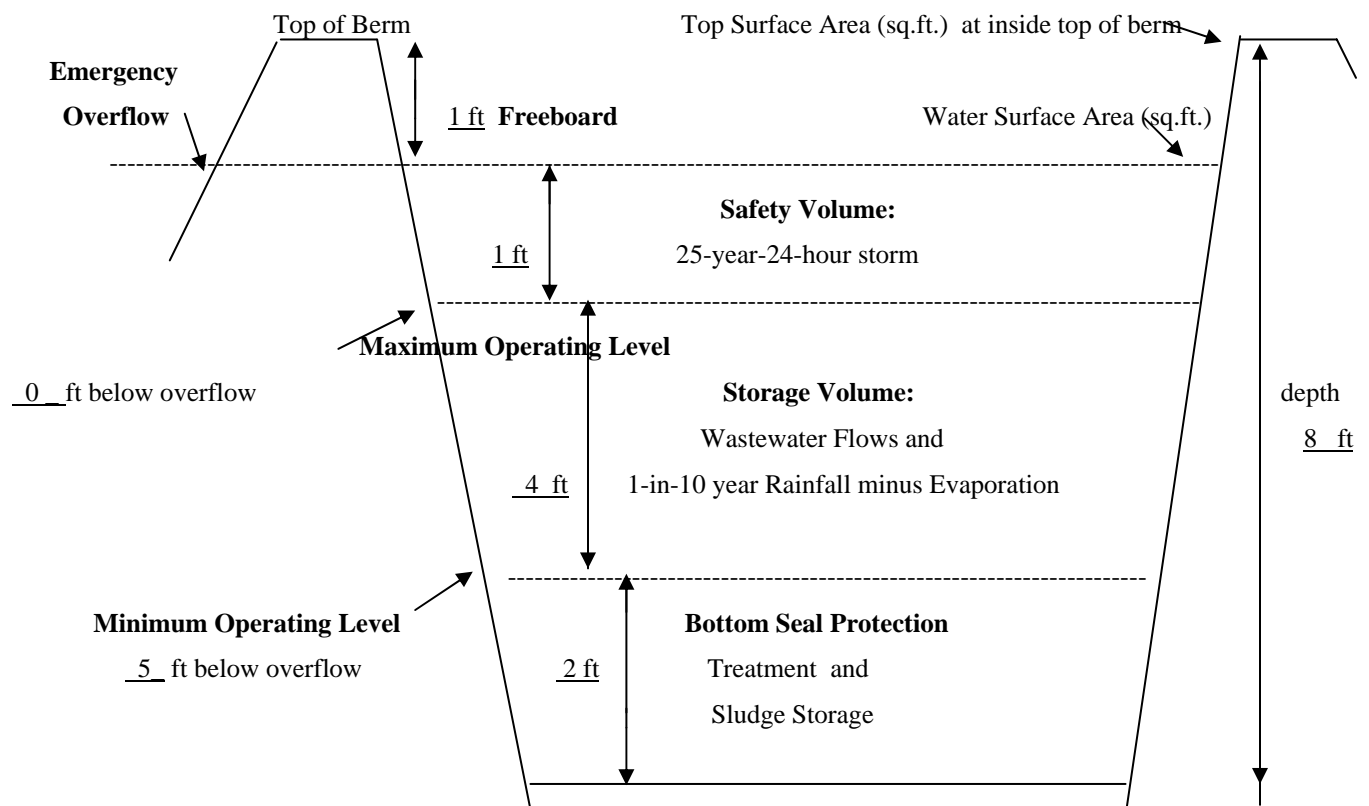
Equipment type: Center pivot

Vegetation: Row crops

Application rate is based on: hydraulic loading rate

Additional Comments:

LAGOON PROFILE



A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS					PAGE NUMBER 4 of 13	
					PERMIT NUMBER MO-0111287	
The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective upon issuance and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
OUTFALL NUMBER AND EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAG E	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
<u>Outfall #001</u>						
Flow	MGD	*		*	once/month	24 hr. estimate
Biochemical Oxygen Demand ₅ **	mg/L	65		45	once/month	grab
Total Suspended Solids**	mg/L	110		70	once/month	grab
Ammonia Nitrogen as N	mg/L	*		*	once/month	grab
pH - Units	SU	***		***	once/month	grab
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2006</u> .						
<u>Outfall #001</u> - Land application Operational Monitoring (Notes 1 & 2)						
Lagoon Freeboard	feet	*		*	once/month	measured
Irrigation Period	hours	*		*	once/daily	total
Volume Irrigated	gallons	*		*	once/daily	total
Application Area	acres	*		*	once/daily	total
Application Rate	inches/ acre	*		*	once/daily	total
Rainfall	inches	*		*	once/daily	total
MONITORING REPORTS SHALL BE SUBMITTED <u>ANNUALLY</u> ; THE FIRST REPORT IS DUE <u>October 28, 2006</u> . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						
B. STANDARD CONDITIONS						
IN ADDITION TO SPECIFIED CONDITIONS STATED HEREIN, THIS PERMIT IS SUBJECT TO THE ATTACHED <u>Parts I & III</u> STANDARD CONDITIONS DATED <u>October 1, 1980 and August 15, 1994</u> , AND HEREBY INCORPORATED AS THOUGH FULLY SET FORTH HEREIN.						

MO 780-0010 (8/91)

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

- * Monitoring requirement only.
- ** Report as no-discharge when a discharge does not occur during the report period.
This facility is required to meet a removal efficiency of 65% or more.
- *** pH is measured in pH units and is not to be averaged. The pH is to be maintained at or above 6.0 pH units.

Note 1 - Lagoon freeboard shall be reported as lagoon water level in feet below the overflow level. See Special Conditions for Wastewater Irrigation System requirements.

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (continued)

Note 2 - Records shall be maintained and summarized into an annual operating report, which shall be submitted by January 28th of each year for the previous calendar year period. The report shall include the following:

- a. Record of maintenance and repairs performed during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;
- b. A summary of the irrigation operations including freeboard at the start and end of the irrigation season, the number of days of irrigation for each month, the total gallons irrigated, the total acres used, crops grown, crop yields per acres, the application rate in inches/acre per day and for the year, the monthly and annual precipitation received at the facility and summary of testing results.

C. SPECIAL CONDITIONS

1. Report as no-discharge when a discharge does not occur during the report period.
2. Outfalls must be marked in field and on the topographic site map submitted with the permit application.
3. Permittee will cease discharge by connection to area wide wastewater treatment system within 90 days of notice of its availability.
4. Water Quality Standards
 - a. Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria.
 - b. General Criteria. The following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:
 - (1) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;
 - (2) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;
 - (3) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;
 - (4) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;
 - (5) There shall be no significant human health hazard from incidental contact with the water;
 - (6) There shall be no acute toxicity to livestock or wildlife watering;
 - (7) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;
 - (8) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

C. SPECIAL CONDITIONS (continued)

5. Reopener Clause

- a. This permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified limitations or other conditions pertaining to phosphorus application rates to soils, the adequacy of wastewater lagoon liners, or other special conditions as may be necessary to protect waters of the state.
- b. Nutrient Management Plan. The permit may be modified or reopened to require submittal of a Nutrient Management Plan (NMP) in accordance with state, EPA and USDA guidelines and regulations or where determined appropriate by the department to meet water quality standards for nutrients. This determination may be based upon ambient water quality monitoring, Section A monitoring requirements and other applicable information.
- c. This permit may be reopened and modified or alternatively revoked and reissued to incorporate new or modified effluent limitations or other conditions if, as the result of a watershed analyses, a Total Maximum Daily Load (TMDL) limitation is developed for the receiving waters which are currently included in Missouri's list of waters of the state not fully achieving the states water quality standards.
- d. The permit may be reopened and modified or alternatively revoked and reissued, to incorporate new or modified effluent limitations or other conditions, if the result of a wasteload allocation study, toxicity test, or other information indicates changes are necessary to ensure compliance with Missouri's Water Quality Standards.
- e. This permit may be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2) (C), and (D), 304(b)(2) and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:
 - (1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
 - (2) Controls any pollutant not limited in the permit.The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

6. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

- (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
 - (1) One hundred micrograms per liter (100 µg/L);
 - (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
 - (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
 - (4) The level established in Part A of the permit by the Director.
- (b) That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant, which was not reported in the permit application.

7. Sludge and Biosolids Use For Domestic Wastewater Treatment Facilities

- (a) Permittee shall comply with the pollutant limitations, monitoring, reporting, and other requirements in accordance with the attached permit Standard Conditions.
- (b) If sludge is not removed by a contract hauler, permittee is authorized to land apply biosolids. Permit Standard Conditions, Part III shall apply to the land application of biosolids. Permittee shall notify the department at least 180 days prior to the planned removal of biosolids. The department may require submittal of a biosolids management plan for department review and approval as determined appropriate on a case-by-case basis.

C. SPECIAL CONDITIONS (continued)

8. Lagoons and earthen basins shall have a liner that is designed, constructed and maintained in accordance with 10 CSR 20-8.020(13)(A)4. If operating records indicate, excessive percolation, the department may require a water balance test in accordance with 10 CSR 20-8.020(16) or other investigations to evaluate adequacy of the lagoon seal. The department may require corrective action as necessary to eliminate excess leakage.
9. Annual Report. (Outfall #001)
An annual report is required in addition to the quarterly reporting under Section A of this permit. The annual report shall be submitted by January 28 of each year for the previous growing season from October 1 through September 30 or an alternate 12 month period approved by the Department and listed in the Operation and Maintenance Manual. This report shall be submitted using report forms approved by the Department and shall include a summary of the monitoring and record keeping required by the Special Conditions and Standard Conditions of this permit. The report shall include the following:
 - a. Record of maintenance and repairs performed during the year, average number of times per month the facility is checked to see if it is operating properly, and description of any unusual operating conditions encountered during the year;
 - b. The number of days the lagoon has discharged during the year, the discharge flow, the reasons discharge occurred and effluent analysis performed; and
 - c. A summary of the irrigation operations including freeboard at the start and end of the irrigation season, the number of days of irrigation for each month, the total gallons irrigated, the total acres used, crops grown, crop yields per acre, the application rate in inches/acre per day and for the year, the monthly and annual precipitation received at the facility and summary of testing results.
10. Wastewater Irrigation System. (Outfall #001)
 - a. Discharge Reporting. Any unauthorized discharge from the lagoon or irrigation system shall be reported to the department as soon as possible but always within 24 hours. Discharge is allowed only as described in the Facility Description and Effluent Limitations sections of this permit.
 - b. Irrigation Design. Design and operation shall be in accordance with 10 CSR 20-8.020(15). Permittee shall operate the land application system in accordance with the design parameters listed in the Facility Description section of this permit:
 - (1) No-Discharge System. When the Facility Description is a No-Discharge, wastewater must be stored and irrigated at appropriate times. There shall be no-discharge from the irrigation site or storage lagoon except due to precipitation exceeding either the 1-in-10 year rainfall event for the design storage period or the 25-year-24-hour rainfall event.
 - (2) Partial Irrigation System. When the Facility Description is a Partial Irrigation, or combined irrigation and discharge, wastewater will be irrigated when feasible and discharges are allowed as specifically authorized under the Effluent Limitations and Monitoring Requirements in Section A of this permit.
 - c. Lagoon Operating Levels - No-discharge Systems. The minimum and maximum operating water levels for the storage lagoon shall be clearly marked. Each lagoon shall be operated so that the maximum water elevation does not exceed one foot below the overflow point except due to exceedances of the 1-in-10 year or 25-year-24 hour storm events. Wastewater shall be land applied whenever feasible based on soil and weather conditions and permit requirements. Storage lagoon(s) shall be lowered to the minimum operating level prior to each winter by November 30.

C. SPECIAL CONDITIONS (continued)

10. Wastewater Irrigation System (continued)

- d. Emergency Spillway. Lagoons and earthen storage basins shall have an emergency spillway to protect the structural integrity of earthen structures during operation at near full water levels and in the event of overflow conditions. The spillway shall be at least one foot below top of berm. The department may waive the requirement for overflow structures on small existing basins.
- e. Land Application Site Locations. The permittee shall land apply only to suitable sites located within the overall property boundaries and descriptions listed in the permit application and approved Operation and Maintenance Manual. Permittee requests for additional sites including non-owned property must follow permit modification procedures prior to land application. To request additional sites, the permittee should submit a revised application Form A and I, mailing addresses for first down stream land owners of each site, topographic maps and other pertinent information for the proposed sites.
- f. Subsurface Injection Requirement. Subsurface Injection or immediate incorporation after surface application should be considered where feasible and practicable to reduce exposure to wash off by storm water runoff and to retain nutrients in the soil for crop requirements. Surface application may be used when practical in accordance with procedures in the approved Operation and Maintenance Manual.
- g. Land Application Equipment. The land application system shall be operated so as to provide uniform distribution of applied wastes over the entire application site. A complete ground cover of vegetation shall be maintained on the irrigation site unless the system is approved for row crop irrigation. Land application shall occur only during daylight hours. The land application system shall be capable of land applying the annual design flow during an application period of less than 100 days or 800 hours per year.
- h. Saturated/Frozen Conditions. There shall be no land application during frozen, snow covered, or saturated soil conditions. There shall be no spray irrigation on days when more than 0.2 inch of precipitation is received or when there is observation by operator of an imminent or impending rainfall event. An on-site visual investigation of the field's soil moisture condition, followed by testing of the soils, will be made to determine whether land application can occur. The visual and soil test procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- i. Buffer Zones. There shall be no irrigation within 300 feet of any down gradient, sinkhole, losing stream or water supply withdrawal; 300 feet of any lake or pond used for water supply; 100 feet of other ponds and lakes; 100 feet of gaining streams; 50 feet of intermittent or wet weather streams; 150 feet of dwelling; or 50 feet of the property line.
- j. Public Access Restrictions. Public access shall not be allowed to the irrigation site(s). Fencing and public access restrictions to land application sites shall be in accordance with requirements in 10 CSR 20-8.020(15)(b)(5).
- k. Equipment Checks during Irrigation. The irrigation system and application site shall be visually inspected at least once/4 hours during wastewater irrigation to check for equipment malfunctions and runoff from the irrigation site.

C. SPECIAL CONDITIONS (continued)

11. Nutrient Management

- a. Nitrogen. The permittee shall not exceed the plant available nitrogen management approach as listed in this permit.
- b. Phosphorus. When soil test phosphorus (P) levels are above 120 pounds per acre using Bray P-1 test method, the sludge application rate shall not exceed the annual crop requirements for available phosphorus in accordance with state NRCS guidelines. When state NRCS standards and guidelines become available, the permit will be revised to include the Phosphorus Threshold and Phosphorus Index methods to be developed under the USDA, NRCS National Policy, General Manual, Part 402.06.
- c. The actual application rates for a given year or growing season must be adjusted based on the approved management approach and the actual sludge and soil testing results and crop requirement. If crop yields are less than that predicted in the permit application, the application rates must be reduced or the yields increased through appropriate changes in management practice.
- d. This permit will be modified to require a Nutrient Management Plan (NMP) after promulgation of applicable state, EPA and USDA rules and guidelines. The NMP will replace the current PAN and phosphorus methods.

12. Plant Available Nitrogen (PAN) Procedure

- a. Wastewater, sludge and fertilizer nitrogen applications shall not exceed the crop nitrogen requirements based on realistic crop yield goals and the Plant Available Nitrogen (PAN) method. The wastewater application rate shall be calculated as follows:

$$\text{PAN} = \text{CNR} - \text{SRN} - \text{CFN}$$

WHERE: **CFN** = Commercial Fertilizer Nitrogen applied in pounds N/acre.
CNR = Crop Nitrogen Requirement in pounds N/acre
PAN = Plant Available Nitrogen in wastewater and sludge
expressed as annual pounds N/acre.
SRN = Soil Residual Nitrogen in pounds N/acre.

- b. Plant Available Nitrogen (PAN) is calculated as follows:

$$\begin{aligned} \text{PAN} = & [\text{Ammonia Nitrogen}] \times [\text{Availability Factor}] \\ & + [\text{Organic Nitrogen}] \times [\text{Availability Factor}] \\ & + [\text{Nitrate Nitrogen}] \times [\text{Availability Factor}] \end{aligned}$$

For anaerobic treated wastewater and sludge, the nitrate nitrogen amounts will be negligible and can be ignored.

- c. Plant Available Nitrogen (PAN) Availability factors are as follows:

1. Average Availability factors for all fields:

<u>Type of Nitrogen</u>	<u>Surface Application</u>	<u>Immediate Incorporation or Subsurface Injection</u>
Organic	0.25 - 0.75*	0.25 - 0.75*
Ammonia	0.6**	0.9**
Nitrate	0.9**	0.9**

* Organic Nitrogen = [Total Kjeldahl Nitrogen as N] - [Ammonia as N].
Availability Factors based on time after application and waste type are:

C. SPECIAL CONDITIONS (continued)

12. Plant Available Nitrogen (PAN) Procedure (continued)

Type of Wastewater Period and Sludge Cumulative Treatment Methods	Organic Nitrogen Availability Factor by Time			
	Year	Year	Year	
	1	2	3	Year 3+
Wastewater storage (aerobic or anaerobic)	0.40	0.20	0.10	0.70
Sludge storage (< 2 years storage time)	0.40	0.20	0.10	0.70
Lime Stabilized Sludge	0.40	0.20	0.10	0.70
Aerobic Sludge Digester	0.30	0.15	0.08	0.53
Anaerobic Sludge Digester	0.20	0.10	0.05	0.35
Sludge retained in wastewater treatment lagoon (35 lbs BOD/acre loading and >15 years sludge retention)	0.20	0.10	0.05	0.35
Composted Sludge (Class A)	0.10	0.05	0.03	0.18

NOTES: Year 1 is the current year of waste application; year 2 is the previous year of waste application; and year 3 is waste application two years ago. Nitrogen availability for years 1, 2 and 3 must be added when waste is applied in consecutive years. The cumulative factor is used when waste is applied at about the same rate for 3 consecutive years or longer.

****** Average inorganic nitrogen availability based on the typical soil and climate conditions when considering additions due to precipitation, dry deposition, and foliar absorption versus losses due to volatilization and denitrification (10% denitrification loss is included). The permittee may choose to use this average value for all fields or may adjust the N availability based on site specific soil conditions using the following tables under 'Field Specific Availability Factors for Inorganic Nitrogen'.

2. Field Specific Availability Factors for Inorganic Nitrogen.

For ammonia and nitrate nitrogen factors, the permittee may choose to use the average value for all fields under paragraph C.1. above, or may use the alternate factors on a field specific basis using the tables below. The approved factors for each field will be included in the O&M Manual.

Table A. Alternate Field Specific Availability Factors for Surface Application					
% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
< 2	71	66	62	56	45
2-5	66	60	56	49	30
> 5	63	56	49	38	19
Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.					

C. SPECIAL CONDITIONS (continued)

12. Plant Available Nitrogen (PAN) Procedure (continued)

Table B. Alternate Field Specific Availability Factors for Sub-Surface Injection or Immediate Incorporation.

% of inorganic N (manure., precip.) available					
Soil Organic Matter %	Excessively well drained	Well drained	Moderately well drained	Somewhat poorly drained	Poorly drained
< 2	89	84	78	70	57
2-5	84	76	70	62	38
> 5	80	70	62	48	24

Adapted from USDA-NRCS, National Engineering Handbook, Part 651, Animal Waste Management Field Handbook (AWMFH), April 1992, Tables 11-6 and 11-8.

d. Soil Residual Nitrogen (SRN).

- For Annual Crops, the nitrogen availability from soil organic matter must be included based on soil CEC and crop season as follows:

SRN in pound N/acre* = [percent organic mater] x Soil Availability Factor

Soil Availability Factor by Soil CEC Ranges and Organic Matter				
Growing Season	Organic Matter	CEC 10	CEC 10-18	CEC >18
Summer	1%	40*	20	10
Winter	1%	20*	10	5

***Note:** If CEC is less than 10 and organic matter is 1.5% or greater, the total SRN is constant at 60 pounds nitrogen for summer and 30 pounds for winter.

- For Perennial Crops the SRN is considered zero(0) for purposes of these calculations because the SRN has already been considered in the crop fertilization recommendations in the referenced publications.
- Crop nitrogen requirements shall be based on University of Missouri publication, Soil Test Interpretations and Recommendations Handbook, as revised or one of the other reference publications listed in this permit. Alternate reference publications may be used only upon prior approval by the department and shall be listed in the approved Operation and Maintenance Manual.
 - If a crop is not harvested, the PAN rate shall not exceed 40 lbs/acre/year and grass vegetation must be maintained on the site.
 - PAN calculations, application amounts, crop yields and crop removal rates shall be listed in the annual report.
 - Conversion Factors for laboratory testing results:
[mg/L or mg/kg or ppm] x [conversion factor] = [pounds per Unit Volume]

C. SPECIAL CONDITIONS (continued)

12. Plant Available Nitrogen (PAN) Procedure (continued)

<u>Unit Volume</u>	<u>Conversion Factors</u>
lbs/acre inch	0.226
lbs/1,000 gallons	0.0083
lbs/100 cubic feet	0.0062
lbs/ton (wet wt)	0.002

- i. Alternate nitrogen availability factors may be considered based upon site specific conditions for each field and submittal of scientific justification. Alternate factors will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- j. Supplemental nitrogen may be added to row crops when determined necessary for proper plant growth based on testing of plant vegetation or soil nitrate testing during the growing season. Procedures will be reviewed and approved by the department as part of the Operation and Maintenance Manual.
- k. Primary reference publications used herein are:
 - 1. Livestock Waste Facilities Handbook, Midwest Plan Service, MWPS-18, April 1993.
 - 2. National Engineering Handbook, Part 651, Agricultural Waste Management Field Book, USDA, Natural Resources Conservation Service (NRCS), April 1992 and current supplements.
 - 3. Managing Nitrogen for Groundwater Quality and Farm Profitability, Soil Science Society of America, Inc., 1991.
 - 4. Soil Test Interpretations and Recommendations Handbook, University of Missouri, Department of Agronomy, December, 1992.
 - 5. Land Application of Sewage Sludge, EPA/831-B-93-002b, U.S. Environmental Protection Agency, December, 1994.

13. Operation and Maintenance Manual (Outfall # 001)

The permittee shall develop, maintain and implement an Operation and Maintenance (O&M) Manual that includes all necessary items to ensure the operation and integrity of the waste handling and land application systems. Copies of the O&M Manual and subsequent revisions shall be submitted to the departments Water Pollution Control Program and Regional Office for review and approval. The O&M Manual shall include, but not limited to, the following:

- a. Detailed topographic maps of the property showing all land application fields including the identification numbers for each field and tract. For spray irrigation systems, each irrigation run shall also be shown. Each field, tract and irrigation run shall have an identification number for record keeping and tracking purposes. The maps shall also indicate separation distances from streams, ponds, wells, and property lines and shall indicate areas exceeding 10 percent slopes and other areas that are not suitable for land application. The maps shall also include the location of all buildings, pump stations, earthen storage basins, storage structures, containment structures, irrigation pipelines, irrigation riser connections, underground terrace outlets, composting areas, dead animal storage or disposal areas, domestic wastewater treatment systems and other waste handling units.
- b. Start up procedures, field supervision during operation, and shutdown procedures of irrigation equipment.
- c. Procedures for providing the separation distances required by this permit and as specified in 10 CSR 20-8.020 (15) (B).
- d. Sample collection, preservation, and testing procedures.
- e. Procedures for determining Plant Available Nitrogen (PAN) loading rates.

C. SPECIAL CONDITIONS (continued)

13. Operation and Maintenance Manual (continued)

- f. Record keeping forms for tracking each field, tract and storage structure. This shall include testing results, crops, yields, and application rates for each field. Records for each field and tract shall include dates and amounts applied.
- g. A procedure for promptly reporting spills or discharges to the permittee plant manager and to DNR.
- h. A procedure for recording repair work on gravity sewer lines, recycle lines, and irrigation lines to include the reason for the repair work and the material used for the repair.
- i. A program to eliminate debris and blockages of sewer lines and recycle lines and to keep debris out of storage structures.
- j. A procedure for routine visual inspections of the storage and irrigation system for overflows or other operational problems.
- k. A program for routine, unannounced inspections of land application sites and records to ensure that all directives for land application from the permittee's central office are being followed. Records of the inspections shall be maintained by the permittee and made available to the department upon request.
- l. A procedure to assure that all appropriate employees are properly trained in operation of the waste systems and are familiar with the O&M Manual.
- m. Procedure for adjusting application periods and rates based on soil infiltration capacity, soil moisture content, and percent of soil field (saturation) capacity.
- n. List of number, size, and capacity of waste removal, hauling and land application equipment.
- o. Number of suitable days each year when land application will occur based on historical one in ten year wettest precipitation and capacity of spreading equipment and personnel available.
- p. Procedure to avoid application if there is a weather forecast for significant precipitation within 24 hours.
- q. Nutrient Management Plan.